

A NEW SPECIES OF SIMULIUM (NEVERMANNAIA) FROM SICHUAN PROVINCE, CHINA (DIPTERA, SIMULIIDAE)

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Abstract The present paper deals with a new species, *Simulium (Nevermannia) ludingense* sp. nov. from Luding County, Sichuan Province, China. This new species seems to fall into the *vernum* group by the shape of the genitalia. The morphological description and taxonomic discussion are given. The type specimens are deposited in the Department of Biology, Medical College Guiyang, China.

Key words Diptera, Simuliidae, *Simulium (Nevermannia)*, new species, China.

The *Nevermannia* Enderlein is a large subgenus in the genus *Simulium* Latreille of the family Simuliidae. It includes more than 195 species in the world (Crosskey, 1997) and 31 species are from China. In this paper, the authors report another new species, *S. (N.) ludingense* sp. nov.

Simulium (Nevermannia) ludingense sp. nov.
(Figs. 1–17)

Female. Body length about 3.0 mm. Wing length about 2.3 mm.

Head. Slightly narrower than thorax. Frons and clypeus brownish black, whitish grey pruinose, covered with short greyish yellow hairs. Frons ratio 7.5:5.0:9.1. Frontal:head ratio 7.5:37.4. Frontal:ocular area well developed. Antenna composed of 2+9 segments, brownish black except scape yellow; 1st flagellar segment about 1.5 times as long as the following one. Maxillary palp with 5 segments in proportion of 3.0:2.8:6.6:5.0:7.0:12.0; 3rd segment enlarged, sensory vesicle elliptical about 0.55 length of 3rd segment. Maxilla with 33 inner teeth and no outer one. Glibarium smooth.

Thorax. Scutum brownish black, densely covered with recumbent whitish yellow hairs, intermixed with erect long black hairs on prescutellar area. Scutellum brownish black, whitish grey pruinose with whitish yellow pubescence. Postscutellum dark and bare. Pleural membrane and katepisternum bare. Legs. All coxae and trochanters brown except fore trochanter yellow. All femora yellow except apical 1/4–1/3 brown. All tibiae brown except median large portion yellow. All tarsi brown except basal 4/5 of hind basitarsus and basal 1/2 of 2nd tarsomere yellow. Fore basitarsus

slender, about 7.5 times as long as wide. Hind basitarsus nearly parallel-sided, about 6.5 times as long as its greatest width. Claws each with large basal tooth. Calcipala and pedisulcus developed. Wing. Costa with spinules as well as hairs; subcosta hairy; basal section of radius fully haired; haltere pale yellow. Hair tuft at base of costa and on stem very blackish brown.

Abdomen. Basal scale brownish, fringe with yellow hairs. Terga dark brown except 2nd tergite somewhat pale brown and covered with brown hairs. Genitalia. Sternite 8 bare medially and with about 17 hairs on each side. Anterior gonapophyses triangular, covered with microsetae and a few short setae; inner margins narrowly sclerotized. Genital fork with slender sclerotized stem and widely expanded arms; arms with well sclerotized ridge, lacking any prominent projection directed forward. Spermatheca elliptic, sclerotized surface with reticulate pattern. Paraproct in lateral view 0.5 as long as wide. Cercus rounded posteriorly about 0.6 as long as width.

Male. Body length about 3.2 mm. Wing length about 2.6 mm.

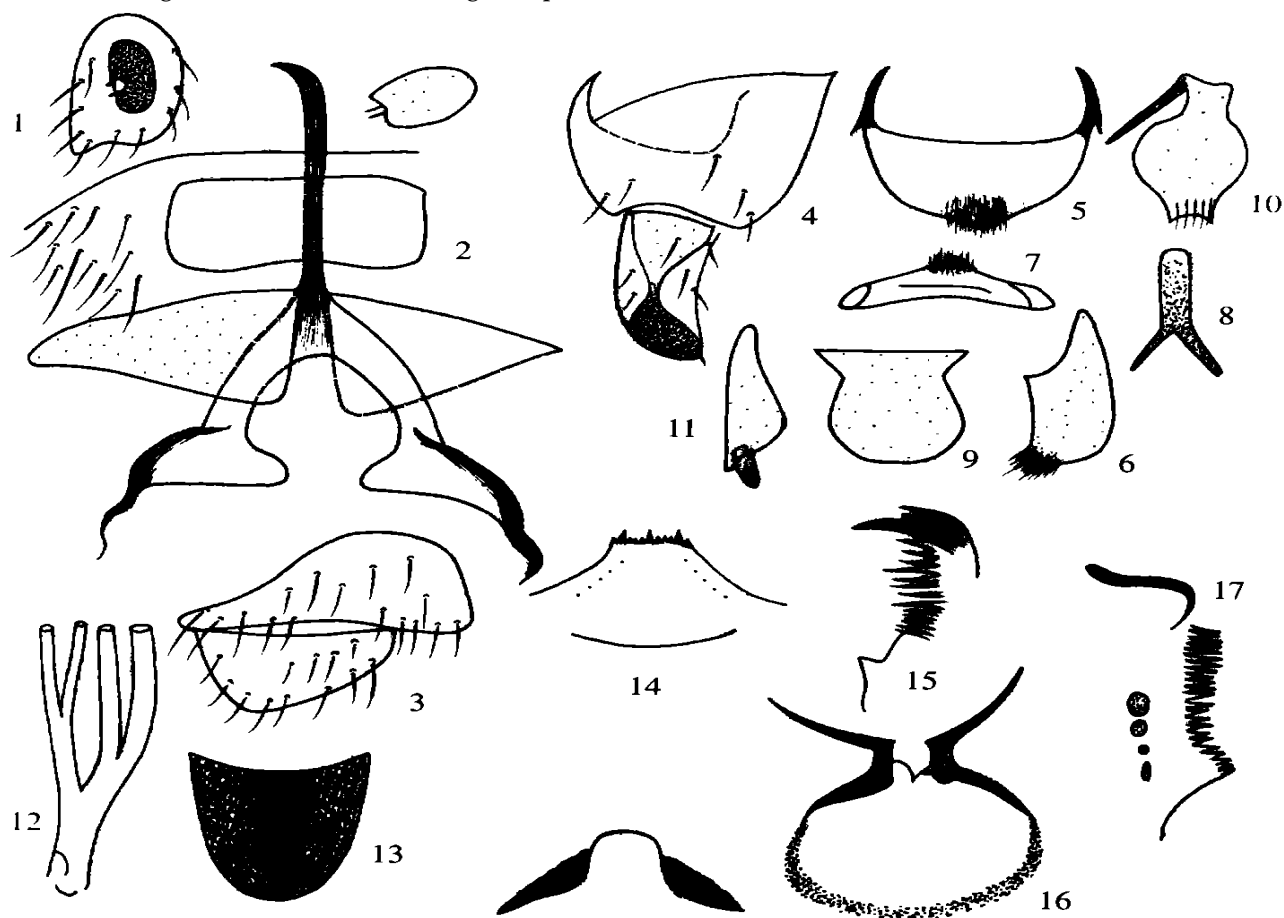
Head. Slightly wider than thorax. Upper eye enlarged, with 16 vertical columns and 15 horizontal rows of large facets. Clypeus brownish black, whitish grey pruinose and covered with a few pale hairs. Antenna composed of 2+9 segments which are brownish black except scape pale yellow; 1st flagellar segment about 2 times as long as following one. Maxillary palp with 5 segments, 3rd segment not so enlarged; sensory vesicle of moderate size, about 1/3 length of 3rd segment.

Thorax. Nearly as in female, except fore basitarsus slender, cylindrical, about 9.0 times as long as wide. Hind basitarsus enlarged, broad distally, about 3.5 times as long as wide; subcosta of wing bare.

Abdomen. Nearly as in female. **Genitalia.** Coxite rectangular in shape, about 1.2 times as long as wide. Style boot-shaped, about 0.9 times length of coxite, twisted inwards and with stronger apical spine. Ventral plate lamellate, semicircular in shape; much shorter than wide and setose medially; proximal margin nearly straight; basal arms well sclerotized, bent inwards as long as plate body. Each paramere with a large hook. Median sclerite slender with bifid tip. Dorsal plate about 1.2 times as long as wide, rounded posteriorly.

Pupa. Body length about 3.0 mm. Head and thorax. Integument sparsely covered with small tubercles. Head with 1 facial and 3 frontal pairs of long, simple trichomes. Thoracic with 6 pairs of simple, long trichomes. Gill organ with 4 filaments arranged in pairs,

shorter than pupal body, the basal stout stem divided into 2 primary stalks of variable length, each primary stalk divided again into 2 secondary slender filaments; all filaments slender, tapering distally, with numerous transverse ridges and covered densely with minute tubercles; dorsal most filaments somewhat longer and thicker than other 3 filaments. Terga 1 and 2 dark yellow, weakly tubercles; tergum 2 with 6 short hairs on each side; terga 3 and 4 each with 4 hooked spines on each side; terga 5-8 each with spine combs and also comb-like groups of minute spines laterated on each side; tergum 9 with a pair of stout terminal hooks and also comb-like groups of minute spines in transverse rows on each side. Sternum 5 with a pair of bifid hooks which situated close together each other laterally; sterna 6 and 7 each with a pair bifid hooks widely spaced. Cocoon. Wall pocket shaped, tightly woven, extending ventrolaterally, with a thick anterior margin but without anterodorsal projection.



Figs. 1-17. *Simulium (Nevermannia) ludingense* sp. nov. 1. Female sensory vesicle. 2. Female genitalia. 3. Paraproct and circus. 4. Coxite and style. 5. Ventral plate. 6. Ventral plate in lateral view. 7. Ventral plate in end view. 8. Median sclerite. 9. Dorsal plate of male. 10. Parameral organ. 11. Basitarsus of male hind leg. 12. Filaments. 13. Cocoon in dorsal view. 14. Larval head capuscles in ventral view. 15. Larval mandible. 16. Larval anal sclerite and ring of minute spines. 17. Posterior tip of larval abdomen in side view.

Mature larva. Body length 6.0-6.5 mm. Body color grayish yellow. Cephalic apotome with positive head spots; antenna longer than stem of cephalic fan, composed of 4 segments in proportion of 6.4: 6.7: 5.6: 0.2. Cephalic fan each with 36 main rays. Mandible with a large mandibular serration but without supernumerary serration. Hypostomial teeth 9 in number, of which corner and median teeth prominent; lateral serration moderately developed on apical 1/2; 5 hypostomial setae lying parallel to lateral margin on each side. Postgenal cleft shallow, rounded anteriorly, about 0.6 times as long as postgenal bridge. Thoracic and abdominal integument bare. Rectal gill lobes compound, each lobe with 16-20 finger-like secondary lobules. Anal sclerite X-formed with anterior short arms about 0.8 times as long as posterior ones; ring of minute spines round rectal papilla. Accessory sclerite marked and moderately sclerotized. Posterior circlet with about 82 rows of 11-13 hooklets per row. Ventral papillae well developed.

Holotype ♀, reared from pupa, slide mounted, collected in a small, shaded stream from Yuewangmiao, Luding County (29°39' N, 102°07' E, 1 800 m), Sichuan Province, China. 19 Sep. 2003. Paratypes: 7 ♀♀, 5 ♂♂, all pinned with pupal exuvia and cocoon, 12 pupae, 5 larvae, same data as holotype, taken from trailing grasses exposed to sun by ZHANG Chunlin and HUANG Li.

Remarks. According to the shape of genitalia, this new species seems belong to the *vernnum*-group defined by Crosskey and Davies (1972). Among this group, the present species is distinctive in having the accessory sclerite on the larval abdomen, which has been reported only in 5 named species, *S. (N.) yushangense*

Takaoka, 1979 *S. (N.) qingshuiense* Chen, 2001 and *S. (N.) zhangjiajiense* Chen *et al.*, 2004 from China, *S. (N.) aberrans* Delfinado, 1983 from Philippines, and *S. (N.) caudisclerum* Takaoka *et Davies*, 1995 from Malaysia. The new species, however, can be readily separated from *S. (N.) yushangense*, *S. (N.) qingshuiense*, *S. (N.) caudisclerum* and *S. (N.) zhangjiajiense* by the lacking an anterodorsal projection on the cocoon. Separated from *S. (N.) aberrans* by the shape of male ventral plate and lacking any supernumerary serrations on the larval mandible.

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四川省虬属纺虬亚属一新种记述 (双翅目, 虬科)

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泸定纺虬, 新种 *Simulium* (*Nevermannia*) *ludingense* sp. nov. (Figs 1-17)

根据雄虫尾器和蛹呼吸丝特征, 新种应隶属于纺虬亚属的宽足虬组 *vernnum*-group。新种的主要特征是幼虫后腹节具附骨, 这一特征在该组见于报告者仅有 5 种, 即产自我国台湾的 *S. (N.) yushangense*、湖南的 *S. (N.) zhangjiajiense* 和贵州的 *S. (N.) qingshuiense*、菲律宾的 *S. (N.) aberrans*

关键词 双翅目, 虬科, 虬属纺虬亚属, 新种, 中国。

中图分类号 Q969.442.9

以及马来西亚的 *S. (N.) caudisclerum*。但新种蛹茧无前背突可与 *S. (N.) yushangense*、*S. (N.) qingshuiense*、*S. (N.) zhangjiajiense* 和 *S. (N.) caudisclerum* 相区别; 其雄性生殖腹板呈半圆形以及幼虫上颚缘齿无附齿列可与 *S. (N.) caudisclerum* 相区别。

正模♀, 副模 7♀♀, 5 ♂♂, 12 蛹, 5 幼虫, 2003-09-19, 采自泸定县药王庙小溪水草。模式标本存放于贵阳医学院生物学教研室。